

## CLAIMS

1. A method of forming a vacuum microelectronic device comprising:

5 forming at least one electron emitter on a substrate;

applying a first electric field to move a portion of the at least one electron emitter in a direction toward the first electric field; and

10 maintaining the at least one electron emitter in the direction after removing the first electric field.

2. The method of claim 1 wherein applying the first electric field includes applying the first  
15 electric field to have a value of at least 0.2 to 50 volts per micro-meter, and further including extracting a current from the at least one electron emitter wherein the at least one electron emitter has an internal current density of at least  $1 \times 10^4$  amperes per  
20 square centimeter.

3. The method of claim 1 further including subsequently operating the at least one electron emitter using a second electric field having a value  
25 that is less than the value of the first electric field.

4. The method of claim 3 wherein using the second electric field includes using the second  
30 electric field having a value that is less than ninety percent of the value of the first electric field.

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5. The method of claim 1 wherein applying the first electric field includes using a sequence of alternately applying and removing the first electric field.

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6. The method of claim 1 wherein forming at least one electron emitter on a substrate includes forming at least one nanotube emitter on the substrate.

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7. A method of forming a vacuum microelectronic device comprising:

providing a substrate having an attachment site;

forming a plurality of electron emitters on the  
5 attachment site wherein at least one of the plurality  
of electron emitters has a first direction and another  
one of the plurality of electron emitters has a second  
direction that is different from the first direction;

applying a first electric field extending in a  
10 third direction away from the substrate wherein the  
first electric field has a value that is sufficient to  
extend a distal end of the at least one of the  
plurality of electron emitters to a position toward a  
direction of the first electric field; and

15 maintaining the at least one of the plurality of  
electron emitters in the position after removing the  
first electric field.

8. The method of claim 7 wherein applying the  
20 first electric field further includes extracting  
current from the at least one of the plurality of  
electron emitters, the current having a current density  
that is at least  $1 \times 10^4$  amperes per square centimeter.

25 9. The method of claim 7 further including  
subsequently operating the at least one of the  
plurality of electron emitters using a second electric  
field having a value that is less than ninety per cent  
of the value of the first electric field.

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13. A method of forming a vacuum microelectronic device comprising:

forming a plurality of electron emitters on an attachment site of the vacuum microelectronic device;

5 extracting electrons from the plurality of electron emitters at a first current density sufficient to extend a distal end of at least one of the plurality of electron emitters to a direction away from the attachment site; and

10 maintaining the at least one of the plurality of electron emitters toward the direction after stopping the electron extraction.

14. The method of claim 13 further including:

15 forming an anode overlying the at least one of the plurality of electron emitters; and

forming a gate electrode proximal to and displaced from the plurality of electron emitters.

20 15. The method of claim 14 further including forming a phosphor on a surface of the anode.

25 16. The method of claim 14 wherein extracting electrons includes applying a first electric field between the anode and the at least one of the plurality of electron emitters and subsequently operating the at least one of the plurality of electron emitters using a second electric field having a value that is less than  
30 field.

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17. The method of claim 13 further including  
operating the at least one of the plurality of electron  
emitters by extracting electrons at a second current  
density having a value that is less than one-half of  
5 the value of the first current density.

18. The method of claim 13 wherein forming the  
plurality of electron emitters on the attachment site  
further includes forming a plurality of attachment  
10 sites and a plurality of electron emitters on each  
attachment site.

19. The method of claim 18 further including  
forming an anode overlying each attachment site.  
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20. The method of claim 13 wherein extracting  
electrons includes using a sequence of alternately  
extracting electrons and ceasing the electron  
extraction.  
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